

# REVISED COST PROPOSAL

	2/1/95 - 2/29/96	2/1/96 - 2/28/97	2/1/97 - 2/28/98	Total
	Requested First Yr. Funding	Requested Second Yr. Funding	Requested Third Yr. Funding	Three Year Funding
<b>Personnel</b>				
Azriel Rosenfeld (P.I.) (1 mo./yr., cost share)				
Larry Davis (Co-P.I.) (2 mo./yr; cost share in first year)	\$ —	\$ 21,129	\$ 21,974	\$ 43,103
Rama Chellappa (Co-P.I.) (2 mo./yr; 1 mo. cost share in first two years)	9,918	10,315	21,455	41,688
Asst. Research Scientists (3, years 1 & 2; 2.8, year 3)	136,645	142,111	137,942	416,698
David Harwood (Faculty Research Asst., 50%)	23,731	24,680	25,667	74,078
Graduate Research Asst. III (2) (6 mos./yr. each)	27,490	28,590	29,734	85,814
Graduate Research Asst. II (2) (6 mos./yr. each)	26,462	27,520	28,621	82,603
Automation Specialist, 100%	31,075	32,318	33,611	97,004
Word Processor Scientific, 25%	5,912	6,148	6,394	18,454
<b>Total Salaries</b>	261,233	292,811	305,398	859,442
<b>Benefits</b>				
Tuition—60 hours (@ \$210/hr., first year)	12,600	13,104	13,628	39,332
Fringe benefits @ 25% of salaries	65,308	73,203	76,350	214,861
<b>Total Benefits</b>	77,908	86,307	89,978	254,193
<b>Equipment</b>				
Sun SparcStations @ \$15,140 each 4 in year 1, 2 in year 2	60,560	30,280	—	90,840
<b>Maintenance</b> (10% of equipment cost)	—	6,056	9,084	15,140
<b>Travel</b>	30,000	30,500	31,500	92,000
<b>Subsistence</b>	10,000	—	—	10,000
<b>Materials/Supplies</b>	2,000	2,100	2,200	6,300
<b>Publications/Printing</b>	3,000	3,105	3,250	9,355
<b>Telephone/Postage</b>	2,000	2,100	2,200	6,300
<b>Subcontracts</b>				
a) MIT	300,000	300,000	300,000	900,000
b) University of Washington	200,000	200,000	200,000	600,000
<b>Total Direct Costs</b>	\$ 946,701	\$ 953,259	\$ 943,610	\$2,843,570
<b>Indirect Costs @ 48% MTDC</b> [excludes tuition, equipment, and each subcontract after first \$25K]	203,299	196,741	206,390	606,430
<b>Total Costs</b>	\$1,150,000	\$1,150,000	\$1,150,000	\$3,450,000

	3/1/78-2/27/79 (Option) Fourth Yr. Funding	3/1/79-2/27/80 (Option) Fifth Yr. Funding	Total Optional Funding	Total Five Yr. Funding
<b>Personnel</b>				
Azriel Rosenfeld (P.I.) (1 mo./yr., cost share)				
Larry Davis (Co-P.I.) (2 mo./yr.; cost share in first year)	\$ 22,853	\$ 23,767	\$ 46,620	\$ 89,723
Rama Chellappa (Co-P.I.) (2 mo./yr; 1 mo. cost share in first two years)	22,313	23,206	45,519	87,207
Asst. Research Scientists (2.5, fourth year; 2.3, fifth year)	130,652	122,556	253,208	669,906
David Harwood (Faculty Research Asst., 50%)	26,694	27,762	54,456	128,534
Graduate Research Asst. III (2) (6 mos./yr. each)	30,923	32,160	63,083	148,897
Graduate Research Asst. II (2) (6 mos./yr. each)	29,766	30,957	60,723	143,326
Automation Specialist, 100%	34,955	36,353	71,308	168,312
Word Processor Scientific, 25%	6,650	6,916	13,566	32,020
<b>Total Salaries</b>	304,806 ✓	303,677 ✓	608,483 ✓	1,467,925
<b>Benefits</b>				
Tuition—60 hours (@ \$210/hr., first year)	14,173	14,740	28,913	68,245
Fringe benefits @ 25% of salaries	76,202 ✓	75,919 ✓	152,121 ✓	366,982
<b>Total Benefits</b>	90,375	90,659	181,034	435,227
<b>Equipment</b>				
Sun SparcStations @ \$15,140 each 4 in year 1, 2 in year 2	—	—	—	90,840
<b>Maintenance</b> (10% of equipment cost)	9,084	9,084	18,168	33,308
<b>Travel</b>	31,750	32,500	64,250	156,250
<b>Subsistence</b>	—	—	—	10,000
<b>Materials/Supplies</b>	2,235	2,275	4,510	10,810
<b>Publications/Printing</b>	3,300	3,500	6,800	16,155
<b>Telephone/Postage</b>	2,235	2,275	4,510	10,810
<b>Subcontracts</b>				
a) MIT	300,000	300,000	600,000	1,500,000
b) University of Washington	200,000	200,000	400,000	1,000,000
<b>Total Direct Costs</b>	\$ 943,785	\$ 943,970	\$1,887,755	\$4,731,325
<b>Indirect Costs @ 48% MTDC</b> [excludes tuition, equipment, and each subcontract after first \$25K]	206,215	206,030	412,245	1,018,675
<b>Total Costs</b>	\$1,150,000	\$1,150,000	\$2,300,000	\$5,750,000

Univ Wash.

Proposed Budget

Revised 12/20/04

**University of Maryland  
Three Year Basic Cost Estimate  
March 1, 1995 - February 28, 1998**

	Academic Months	Summer Months	Effort	Year 1 1995-96	Year 2 1996-97	Year 3 1997-98	3 Years 1995-98
<b>SALARIES AND WAGES</b>							
Robert Harallick, Professor		1	100%	13,038	13,560	14,102	40,701
Robert Harallick, Professor	9		5%	5,867	6,102	6,346	18,315
(Nine months academic base salary @ \$112,833)							
(3) Pre-Doctoral Res. Asst. II	9	3	50%	47,886	49,801	51,793	149,480
(Yearly base salary @ \$30,695)							
Research Program Coordinator	9	3	25%	7,981	8,300	8,632	24,913
(Yearly base salary @ \$30,695)							
Hourly Personnel				5,000	5,000	0	10,000
(\$10/hr @ 500 hrs/yr; estimated 40-45 hrly person hrs/month)							
<b>TOTAL SALARIES, WAGES</b>				<b>79,773</b>	<b>82,762</b>	<b>80,873</b>	<b>243,408</b>
<b>FRINGE BENEFITS</b>							
Faculty @ 22%				4,159	4,326	4,499	12,984
Graduate Students @ 8%				3,831	3,984	4,143	11,958
Professional Staff @ 26%				2,075	2,158	2,244	6,477
Hourly @ 10%				500	500	0	1,000
<b>TOTAL BENEFITS</b>				<b>10,565</b>	<b>10,968</b>	<b>10,886</b>	<b>32,419</b>
<b>TOTAL SALARIES &amp; BENEFITS</b>				<b>90,338</b>	<b>93,730</b>	<b>91,759</b>	<b>275,828</b>
<b>EQUIPMENT (Computer Upgrade &amp; Equipment)</b>							
				16,000	10,000	8,500	34,500
<b>EXPENDABLE SUPPLIES</b>							
Computer Software				4,000	4,000	7,000	15,000
Computer Equipment Supplies				2,000	2,000	2,000	6,000
Miscellaneous Supplies				2,400	1,875	1,600	5,875
<b>TOTAL SUPPLIES</b>				<b>8,400</b>	<b>7,875</b>	<b>10,600</b>	<b>26,875</b>
<b>SERVICES</b>							
Computer Laboratory Fees				7,000	7,000	7,000	21,000
Publications				2,000	2,000	2,000	6,000
Postage, Telephone, Facsimile, Copy, etc.				1,500	1,500	1,475	4,475
<b>TOTAL SERVICES</b>				<b>10,500</b>	<b>10,500</b>	<b>10,475</b>	<b>31,475</b>
<b>TRAVEL</b>							
				3,000	3,000	2,000	8,000
<b>GRADUATE OPERATING FEES</b>							
				17,325	19,067	20,970	57,362
<b>TOTAL DIRECT COSTS:</b>				<b>145,563</b>	<b>144,173</b>	<b>144,305</b>	<b>434,041</b>
<b>INDIRECT COSTS @ 48.5%</b>				<b>54,437</b>	<b>55,827</b>	<b>55,695</b>	<b>165,959</b>
<b>TOTAL DIRECT AND INDIRECT COSTS:</b>				<b>200,000</b>	<b>200,000</b>	<b>200,000</b>	<b>600,000</b>

Note: 4% increase/year projected for salaries starting the second year.

10% increase/year projected for tuition starting the second year.

Graduate Operating Fees and Equipment are exempt from indirect costs.

**University of Maryland**  
**Two Year Option Cost Estimate**  
**March 1, 1998 - February 28, 2000**

	Academic Months	Summer Months	Effort	Year 4 1998-99	Year 5 99-2000	2 Yr Option 1998-2000
<b>SALARIES AND WAGES</b>						
Robert Haralick, Professor		1	100%	14,667	15,253	29,920
Robert Haralick, Professor (Nine months academic base salary @ \$112,633)	9		5%	6,600	6,864	13,464
(3) Pre-Doctoral Res. Asst. II (Yearly base salary @ \$30,696)	9	3	50%	53,865	56,020	109,885
Research Program Coordinator (Yearly base salary @ \$30,696)	9	3	25%	8,977	9,337	18,314
Hourly Personnel (\$10/hr @ 500 hrs/yr; estimated 40-45 hrly person hrs/month)				0	0	0
<b>TOTAL SALARIES, WAGES</b>				<b>84,109</b>	<b>87,472</b>	<b>171,581</b>
<b>FRINGE BENEFITS</b>						
Faculty @ 22%				4,679	4,866	9,544
Graduate Students @ 8%				4,309	4,482	8,791
Professional Staff @ 25%				2,334	2,428	4,762
Hourly @ 10%				0	0	0
<b>TOTAL BENEFITS</b>				<b>11,323</b>	<b>11,774</b>	<b>23,097</b>
<b>TOTAL SALARIES &amp; BENEFITS</b>				<b>95,432</b>	<b>99,246</b>	<b>194,678</b>
<b>EQUIPMENT</b> (Computer Upgrade & Equipment)				<b>6,000</b>	<b>4,000</b>	<b>10,000</b>
<b>EXPENDABLE SUPPLIES</b>						
Computer Software				6,500	6,500	13,000
Computer Equipment Supplies				2,000	2,000	4,000
Miscellaneous Supplies				2,000	0	2,000
<b>TOTAL SUPPLIES</b>				<b>10,500</b>	<b>8,500</b>	<b>19,000</b>
<b>SERVICES</b>						
Computer Laboratory Fees				7,000	5,000	12,000
Publications				0	0	0
Postage, Telephone, Facsimile, Copy, etc.				1,200	1,200	2,400
<b>TOTAL SERVICES</b>				<b>8,200</b>	<b>6,200</b>	<b>14,400</b>
<b>TRAVEL</b>				<b>1,000</b>	<b>1,000</b>	<b>2,000</b>
<b>GRADUATE OPERATING FEES</b>				<b>23,031</b>	<b>25,307</b>	<b>48,338</b>
<b>TOTAL DIRECT COSTS:</b>				<b>144,163</b>	<b>144,253</b>	<b>288,416</b>
<b>INDIRECT COSTS @ 48.5%</b>				<b>55,837</b>	<b>55,747</b>	<b>111,584</b>
<b>TOTAL DIRECT AND INDIRECT COSTS:</b>				<b>200,000</b>	<b>200,000</b>	<b>400,000</b>

Note: 4% increase/year projected for salaries starting the second year.

10% increase/year projected for tuition starting the second year.

Graduate Operating Fees and Equipment are exempt from indirect costs.

# ONR

Looking at People: Detection, tracking, and interpretation of people and their actions in complex scenes.

March 1, 1995 - February 28, 2000

Principal Investigator - Alex P. Pentland

## Revised Budget 12/14/94

Salaries	Base	%	Amount Year One	Amount Year Two	Amount Year Three	Amount Year Four	Amount Year Five	GRAND TOTAL
Alex Pentland (AY)	\$74,450	15%	\$0	\$0	\$0	\$0	\$0	\$0
Alex Pentland (Sum)	\$8,272	1 mo.	\$8,272	\$8,686	\$9,120	\$9,576	\$10,055	\$45,709
Rosalind Picard(AY)	\$56,350	15%	\$0	\$0	\$0	\$0	\$0	\$0
Post-Doc/Res. Sci.(TBN)	\$46,000	45%	\$20,700	\$16,905	\$12,075	\$22,822	\$23,963	\$96,465
Word Processor	\$25,000	60%	\$15,000	\$15,750	\$16,538	\$17,364	\$18,233	\$82,884
Administrative Assist.	\$30,150	25%	\$7,538	\$7,914	\$8,310	\$8,726	\$9,162	\$41,649
2 Research Assistants	\$17,820	100%	\$35,640	\$37,422	\$39,293	\$41,258	\$43,321	\$196,933
<b>Total Salaries</b>			\$87,150	\$86,677	\$85,336	\$99,746	\$104,733	\$463,641
<b>Employee Benefits (43.1%)</b>			\$37,562	\$37,358	\$36,780	\$42,990	\$45,140	\$199,829
<b>Total Salaries + E.B.</b>			\$124,711	\$124,035	\$122,116	\$142,736	\$149,873	\$663,471
<b>Operating Costs</b>								
Materials and Services			\$8,415	\$9,091	\$8,690	\$11,039	\$13,277	\$50,512
Telephones			\$400	\$400	\$400	\$600	\$601	\$2,401
Xeroxing & Printing			\$4,500	\$4,500	\$4,500	\$5,000	\$5,000	\$23,500
Consultant (Stan Sclaroff)			\$10,000	\$10,000	\$5,000	\$0	\$0	\$25,000
Service Contracts			\$5,500	\$5,500	\$5,500	\$5,500	\$5,500	\$27,500
Postage			\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000
Travel			\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
<b>Total Operating Costs</b>			\$35,815	\$36,491	\$31,090	\$29,139	\$31,378	\$163,912
<b>Modified Total Direct Cost</b>			\$160,526	\$160,526	\$153,205	\$171,875	\$181,250	\$827,383
<b>Indirect Cost (52%) ✓</b>			\$83,474	\$83,474	\$85,795	\$103,125	\$108,750	\$464,617
<b>Capital Equipment</b>			\$56,000	\$56,000	\$56,000	\$15,000	\$0	\$183,000
Consultant (Stan Sclaroff)			\$0	\$0	\$5,000	\$10,000	\$10,000	\$25,000
<b>Total Costs</b>			\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$1,500,000



## UNIVERSITY OF MARYLAND AT COLLEGE PARK

CENTER FOR AUTOMATION RESEARCH

Appearance-Based Vision for Complex Environments: Proposal SAI # MD 940728-8040-360201, submitted under the May 1994 program announcement of the FY94 DoD Multidisciplinary Research Program of the University Research Initiative.

December 15, 1994

Attached is a revised budget for a five-year period starting March 1, 1995. The fourth and fifth years can be regarded as options. Detailed budgets for the sub-contracts are also attached.

The principal changes to the budget are as follows:

- 1) Two summer months of co-principal investigator Larry S. Davis during the first year, and one summer month of co-principal investigator Rama Chelappa during the first and second years, will be contributed as cost share.
- 2) The number of Assistant Research Scientists will be 3 during the first two years, 2.8 during the third year, 2.55 during the fourth year, and 2.3 during the fifth year.
- 3) The Word Processor Scientific is reduced to 25%.
- 4) Annual salary increases are estimated at 4% (reduced from 5%).
- 5) Fringe benefits (excluding tuition) are estimated at 25% of salaries (a slight reduction from the detailed estimate in the original proposal).
- 6) The equipment purchase of an SGI Onyx Extreme is eliminated.
- 7) Very small increases are projected for travel and other direct costs.

- 8) Subsistence (for long-term visits by Assistant Research Scientists to the sub-contractors) is reduced from \$24,000 to \$10,000.
- 9) The subcontracts are reduced to \$300,000/yr. (MIT) and \$200,000/yr. (U. of Wash.)

Endorsements:

(b) (6)

Azriel Rosenfeld, Director  
Center for Automation Research

(b) (6)

Erica M. Magrum, Acting Director  
Office of Research Administration  
and Advancement

## Budget Justification

### Personnel

Automation Specialist—Will provide data entry and image input/output support to project personnel, and will also coordinate activities with subcontractors.

Word Processor Scientific—A 60% FTE Word Processor will be assigned to this project to perform document processing tasks specific to the project and which require intensive effort above and beyond that normally required for the completion of project reports associated with the ordinary requirements of Federal contract reporting. These tasks will include inputting data relative to the project, participation in the preparation of materials related to site visits, preparation of papers for submission to conferences and journals, reformatting of material provided by subcontractors for inclusion in project documents, etc. Standard reports normally required under Federal guidelines, technical progress reports, financial reports, travel documents, purchasing documents and correspondence will be prepared by Center staff who are supported by alternative sources.

### Equipment

SparcStation 20-612-64-P46, \$22,495; X116P + 16 MB memory, \$1,175; X579A 644 MB CD, \$750; total \$24,420; less educational discount of 38%; estimated net price \$15,140 each. These workstations will be used exclusively by project personnel. Dedicated workstations are needed because of the extensive experimental component of this project.

SGI Onyx Extreme Graphics, 150/75 MHz, 64 MB memory, 2 GB system disk, 19" monitor, DAT, CD-ROM, Galileo Video, Video Collaboration, Dials and Buttons, Digital Media Devel. RTU, Open Inventor RTU, Performer RTU; list price \$56,000. This system is needed to provide compatibility with our subcontractor, the MIT Media Laboratory, whose programs will be ported to our Center.

### Equipment Maintenance

Estimated at 10% of equipment cost in each year following the year of purchase. The purchase of equipment generally includes one year of maintenance without charge.

### Travel

Attendance of senior project personnel at major annual computer vision conferences, including the ARPA Image Understanding Workshop and the IEEE Computer Society Conference on Computer Vision and Pattern Recognition, as well as specialized conferences on automatic target recognition and face recognition.

Visits by project personnel to subcontractors (see also subsistence).

### Subsistence

Requested at \$24,000 for Year I only for the purpose of supporting two postdoctoral researchers (who will work full time on the project) to make extended visits to each of the subcontractors, MIT (Cambridge, MA) and the University of Washington (Seattle, WA) for 40 weeks each at an estimated cost of \$300 per week.

## **Other**

This project will require substantial support for the preparation of non-standard conference reports, publication submissions, program documentation, phone and mail collaboration with colleagues at other institutions including subcontractors, etc.

Materials and Supplies are estimated at \$200/month. Publications and Printing are estimated at \$300/month. Telephone and Postage are estimated at \$200/month.

## **Subcontracts**

The subcontractors are the MIT Media Laboratory and the University of Washington, as described in the body of the proposal. Budgets for the subcontracts and accompanying budget explanations are also included (see Sections B and C of this cost proposal).

## BUDGET JUSTIFICATION

### Personnel:

Faculty, Professional staff and graduate appointment personnel time is based on a 40 hour work week. The % time is the effort directly spent on the project.

Research hourly personnel will be hired to be appointed as Laboratory Manager.

### Equipment:

1. SPARC 20 Station Server	\$20,000
2. SPARC 5 Upgrade	\$6,000
3. 12' GByte Disks	\$9,000
4. Sparc 5	\$7,000
5. CD-ROM Burner	\$7,000
6. Laser writer	<u>\$2,000</u>
3 YR Basic Total	\$51,000

1. SPARC Station Server	<u>\$18,000</u>
2 YR Option Total	\$18,000

### Expendable Computer Supplies & Software

1. Object Oriented Database for SPARC	\$7,000
2. Energize (3 copies @ 1k/copy)	\$3,000
3. Computer paper & toner cartridge*	\$4,500
4. Color cartridges for color writer	\$2,000
5. 8mm back up tapes & floppy disks	<u>\$1,500</u>
3 YR Basic Total	\$18,000

1. Energize (3 copies @ 1k/copy)	\$3,000
2. Computer paper & toner cartridge*	\$4,000
3. 8mm back up tapes & floppy disks	\$1,500
4. Color cartridges for the color writer	\$2,000
5. University site license for 5 framemaker	\$500
6. Mathematica license	\$1,000
7. Blank CD-ROMS	\$1,000
8. CDROM master software	<u>\$4,500</u>
2 YR Basic Total	\$17,500

\*Toner cartridges, paper, tapes and disks will be used on printers dedicated solely to benefit the research.

Miscellaneous Supplies: Calculation base on historical experience.

Computer Laboratory Fees: Services include maintenance repairs of workstations, disks and laser writer.

Publications: Papers to be submitted to IEEE PAMI, IEEE Image Processing and CVGIP. Requesting publication fees and reprints.

Miscellaneous Services: Estimated cost for services used to solely benefit the research project include:

Postage:	\$150/yr
Long Distance Telephone:	\$350/yr
Facsimile:	\$125/yr
Copy:	\$500/yr
Miscellaneous:	\$375/yr

Travel: To attend the ICCV (Yrs 1 - 3) and CVPR (Yrs 1 & 2) conferences and travel to the University of Maryland for coordination meetings (Yrs 1 - 3).

To attend the ICCV and travel to the University of Maryland for coordination meetings each year if project is extended to an additional two years.

Graduate Operating Fee: Combination of tuition and fees which are required of all graduate research appointments at the University.

## **BUDGET JUSTIFICATION**

### **Salaries:**

Dr. Pentland will provide oversight and supervisory functions (15% effort) during the academic year (AY) at no direct cost to the project; funds for his salary will be provided from the Institute's academic account. Dr. Rosalind Picard will also provide 15% effort during the academic year (AY) at no direct cost to the project; funds for her salary will be provided from the Institute's academic account. The budget provides one full month of summer salary in Years One through Five for Dr. Alex Pentland.

Post Doc/Research Scientist level of effort will be 45% in Year One, 35% in Year Two and 25% in Year Three. Their support goes back to 45% for Years Four and Five. In addition, an Administrative Assistant (25% effort) and Word Processor (60% effort) will participate with clerical and administrative duties by supporting Dr. Pentland; their respective equivalent salaries will be supported from this grant. All salaries are inflated at 5% per year in Years Two through Five.

### **Employee Benefits:**

Benefits are calculated at the approved ONR (proposal) rate of 43.1% for all five years of the project.

### **Operating Costs:**

Operating costs represent modest costs for projects of similar scope.

- |                                  |   |
|----------------------------------|---|
| <b>Materials &amp; Services:</b> | For items needed to support Dr. Pentland and his staff while conducting his research on this project; including office supplies, film and developing costs and other materials and services.  |
| <b>Telephones:</b>               | For long distance calls in relation to the research being done for this grant.  |
| <b>Xeroxing &amp; Printing:</b>  | For papers that are presented at meetings and conferences. Also for submission of research papers to journals for publication.  |
| <b>Consultant</b>                | Dr. Stan Sclaroff (Boston University) will be consulting with Dr. Pentland on this research. Dr. Sclaroff is an Assistant Professor of Computer Science in the College of Liberal Arts at BU. Rate is 50 days/year @ \$200/day. Indirect costs will be charged on the first \$25,000. Fees after the \$25,000 will be exempt from indirect costs. |
| <b>Service Contracts:</b>        | For maintenance & software on Sun SPARCstations, DEC stations & Alphas, SGI Indigos and HP workstations.  |

**Postage:** For all mail associated with the research being done for this grant, i.e. the mailing of papers for submission to journals; correspondence with sponsors, etc.

**Travel:**

In Years One through Five the \$6,000 travel budget will fund a trip to either the ARVO, CVPR or ICCV conference for Dr. Pentland, TBN Post Doctoral/Research Scientist and/or the Research Assistant(s).

**Indirect Costs:**

Indirect costs are calculated at the approved ONR (proposal) rate of 52% for Years One and Two. The cost is 56% for Year Three and 60% for Years Four and Five. The Modified Total Direct Cost Base excludes the cost of capital equipment and consultant subcontractors after the first \$25,000.

**Capital Equipment:**

Year One - \$56,000. Onyx Extreme Deskside, 2x150 MHz R4400, 64 MB memory, 1 MB, 2GB system disk, 19" Monitor, DC-ROM Media.

Year Two - \$56,000. Onyx Extreme Deskside, 2x150 MHz R4400, 64 MB memory, 1 MB, 2GB system disk, 19" Monitor, DC-ROM Media.

Year Three - \$56,000. Onyx Extreme Deskside, 2x150 MHz R4400, 64 MB memory, 1 MB, 2GB system disk, 19" Monitor, DC-ROM Media.

Year Four - \$15,000. Hardware upgrades on above.

Year Five - No funds requested.

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02/22/95 WED 17:19 FAX 703 696 0993 ONR/ACQUISITION

002

SUBMITTAL STATEMENT

Name of Proposing Organization: UNIVERSITY OF MARYLAND

Principal Investigator: DR. AZRIEL ROSENFELD

Proposal Title: APPEARANCE -BASED VISION FOR COMPLEX SYSTEMS

Proposal Number: 94442--0191, ONR; MD 940728-8040-360201

Proposal Date: 16 DEC 1994

As Revised (Date): 1 AUG 94

The referenced proposal was submitted in response to the Office of Naval Research announcement for the MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE published in the Commerce Business Daily on 02 JUN 1994.

2/23/95  
Date

(b) (6)  
AUTHORIZING UNIVERSITY OFFICIAL  
Erica Magrum, Acting Director  
Office of Research Administration & Advancement  
University of Maryland at College Park

R&amp;T PROJECT: 4203010---01

02/22/95 17:23 703 696 0993  
02/22/95 WED 17:18 FAX 703 96 0993 ONR/ACQUISITION

003

4203010 - - - 01

CERTIFICATION  
Proposal Enclosed: APPEARANCE-BASED VISION FOR  
COMPLEX ENVIRONMENTS

1. The undersigned certifies, to the best of his or her knowledge and belief, that:

(a) Pursuant to the requirements of OMB Circular A-129, this organization certifies that it is not delinquent on any Federal debt.

(b) Pursuant to Executive Order 12549 and implementing rule, this organization certifies that it presently is not debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by any Federal department or agency.

(c) Pursuant to PL 100-690 and implementing rule, this organization certifies that it will provide a drug-free workplace. The place of performance is:

Street Address

City, County, State, Zip Code

2. The following certification applies only to actions exceeding \$100,000:

Section 1352, Title 31, U.S.C. (PL 101-121, Section 319) entitled "Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions."

(1) No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-717, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000.

Erica Madrum, Acting Director

(b) (6)

Typed Name, and Signature of the Officer responsible for this transaction

objectives; b) An in-depth discussion of the proposed analyses, including an outline of the planned approach; c) Identification of the data required for the analysis; d) Identification/discussion of the expected products of the analysis, and their potential applications; and e) A complete but succinct statement of work suitable for contractual incorporation. 2. STAFFING - The following information relative to proposed staffing shall be provided, as a minimum: a) Identification of personnel, and discussion of their planned role in the research effort; b) Biographical summaries of key individuals that clearly demonstrate their qualifications for the proposed research roles; and c) A tabulation of current professional commitments for proposed personnel for the duration of the proposed contract term. NOTE: The technical and staffing proposals, combined, should not exceed 100 pages. 3. COST - Proposals shall be specific, complete in every detail, and separate from the technical and staffing proposal. The cost or price breakdown shall be submitted utilizing Standard Forms 1411 and 1411-1 (Contract Pricing Proposal Sheet) as a cover sheet, together with supporting detailed cost data, including any subcontractor data, in accordance with FAR 15.804-6. \*\*EVALUATION OF PROPOSALS AND AWARD EVALUATION CRITERIA\*\* Proposals received will be evaluated in accordance with the evaluation criteria specified herein. The primary basis for selecting proposals for acceptance shall be technical importance to agency programs. Of the three factors, technical is considered of greater importance followed by cost. Past performance is of lesser importance. Technical evaluation will be based on the following criteria, which are listed in order of importance. 1. OVERALL RESPONSIVENESS TO BAA OBJECTIVES AND REQUIREMENTS. The degree to which the proposed research is expected to meet the objectives of this BAA and the degree to which the BAA requirements appear to be met, as well as feasibility in light of current IMS status. 2. TECHNICAL MERIT OF PROPOSED RESEARCH. Overall technical merit, including the completeness, soundness, and general technical adequacy of the proposed workplan in relation to the stated research objectives, as well as the degree of innovation. 3. QUALIFICATIONS TO PERFORM THE PROPOSED RESEARCH, INCLUDING: a) demonstrated technical skills and capabilities consistent with the proposed research approach; b) technical management structure and skills suited to the proposed effort; c) resources, facilities and equipment sufficient to support the proposed effort. Offerors should clearly and fully address each of the above criteria and subcriteria in their proposals. The FHWA reserves the right to select award any, all, part or none of the proposals submitted. 4. GOVERNMENT RIGHTS - The Government anticipates that approximately \$1,700,000 will be dedicated to this program, subject to availability of funds, and anticipates making multiple awards. It is anticipated that no single proposal will be funded for more than \$500,000. The Government reserves the right to incorporate ideas from successful offers into future contracts. This Broad Agency Announcement does not commit the Government to pay for response preparation costs. 5. ELIGIBILITY - All responsible sources may submit a proposal which shall be considered by the FHWA. Consortium arrangements and industrial partnering agreements are encouraged. (0151)

**NASA Headquarters, Flight Systems Division, Washington, DC  
20546 Attn: YF/J. R. Hill**

**A - TEST OF SATELLITE INSTRUMENT ON LANDSAT 7 SOL YF1 POC J. R. Hill** tel: 202/358-0744 Collaborative Research: Solicitation of Interest NASA is interested in entering into an unfunded collaborative research agreement to test a satellite instrument on Landsat 7. The instrument must demonstrate technology advancements, consistent with long-term Landsat data continuity, in land remote sensing capabilities applicable to civilian, commercial, national security, and/or global environmental change research. The goal is to develop new dual-use (commercial and government) land remote sensing technology resulting in an enhancement of US industrial competitiveness and leading to a next generation instrument. The effort will require the non-NASA party to design, build, certify for flight, and support integration, operation and data archiving associated with a land remote sensing instrument to be flown as a flight of opportunity on the Landsat 7 satellite. The non-NASA party will fund all costs associated with this effort. No funding will be provided by NASA. NASA will provide space on the satellite, access to an x-band pointing antenna (transmitter provided by the non-NASA party), power for the instrument on-board the satellite. Operations planning, command and control of the instrument will be through currently planned operation of the spacecraft. The instrument will be operated on a limited time-shared basis with the primary Landsat 7 instrument and must not interfere with its planned operation. The output of the ground based antenna, receiver and down converter will be available as input to the non-NASA party provided demodulator and data capture equipment. (The non-NASA party may propose an alternate data transmission approach that minimizes spacecraft and ground system interfaces). The non-NASA party is responsible for processing the data to enable the NASA science team to evaluate the instrument's performance. At its option NASA may elect to place all or part of the data in the National Satellite Land Remote Sensing Archive with other land remote sensing data which is available to the public. No exclusive rights in the data generated from the instrument will be available or asserted. The government will expect a government-purpose license for the inventions and data developed by the non-NASA party under this agreement. Background data and inventions made remain the property of the non-NASA party. Integration of the instrument would begin in early CY97 continuing through the planned launch date in 1998. The instrument effort must support the scheduled launch of Landsat 7. The non-NASA entity may "partner" with universities (or other education centers), other US and non-US industries, federally funded research and development centers, or federal laboratories (including NASA

Centers) to meet its obligations under the collaborative research effort. A US non-governmental entity must lead the effort, and the amount of private industry investment in the collaborative research and development will be a factor in selection. NASA will maintain technical oversight to ensure compliance with interface requirements, flight certification, integration, and schedule. Following a demonstration of interest (defined below) the industrial parties will be invited to attend a one day overview covering the Landsat 7 spacecraft, interface requirements, development schedule, and collaborative agreement. A summary of the Landsat 7 interface requirements and a list of example technologies of interest to NASA are available from the contacts listed below. A comprehensive technical proposal will be required approximately 20 days following the overview meeting. Interested US non-governmental parties should provide a letter of interest, five pages maximum, describing the instrument and technology to be developed; data continuity with previous Landsat data; developments leading to reduction of cost, weight, power consumption, and schedule for future instruments; the maturity of the instrument (concept, bread board, laboratory model, engineering model, flight model); and participating partner(s). The letter should include a brief summary of partner(s) responsibilities and capabilities to accomplish the development; the approximate cost share ratio (percentage) of each participating partner; and the source and amount of US Government funding, including NASA funding (outside of this agreement), supporting the development of the instrument. Letters of interest should be submitted by COB June 17, 1994 to NASA Headquarters, 300 E Street, SW, Washington, DC 20546, Attention Code YF/Mr. J. R. Hill (202-358-0744). Interface and example technology requests should be directed to Goddard Space Flight Center, Greenbelt, MD 20771, Attention Mr. Jim Andary (301-286-4850) or Dr. Darrel Williams (301-286-7282). (0151)

**Office of Naval Research, Ballston Tower One, 800 North Quincy  
Street, Arlington, VA 22217-5660**

**A - MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE POC Point of Contact: Debbie Hughes, ONR 353, (703) 696-4111.** The Department of Defense announces a competition for fiscal year 1994-1998 funding for the Multidisciplinary Research Programs, one element of the University Research Initiative (URI). The Multidisciplinary Research Program of the URI, hereafter called "MURI", will support research teams whose effort intersect more than on traditional science and engineering discipline. Such team efforts can accelerate research progress in areas particularly suited to this approach and can help hasten the transition of research findings to practical application. Only U.S. academic institutions of higher education with degree-granting programs in science and engineering are eligible to submit proposals. MURI competition is in six specific research topics: (1) mobile electric power; (2) smart structural systems-scale functional design; (3) automated vision/sensing systems; (4) integrated diagnostics; (5) high energy microwave sources; (6) intelligent design and manufacturing in electronics and materials processing. Awards will be made by the Army Research Office, the Office of Naval Research, the Air Force Office of Scientific Research and the Advanced Research Project Agency. This notice constitutes a Broad Agency Announcement as contemplated in FAR 6.102(D)(2). Typically, each award is expected to be (a) for a basic period of three years, (b) funded incrementally or as options, with two additional years possible as per year; and (c) subject to the availability of funds. DoD plans to award \$25 million total in FY94 funds for the first year of these efforts; a comparable amount is expected for each subsequent fiscal year of the program (1995 through 1998). A brochure describes the agencies' research needs upon which the six topics are based. The brochure includes guidance regarding consortia, collaborations, proposal preparation, and evaluation criteria; as well as milestone dates. Proposals must be received at the appropriate address (shown in each research topic description) by 4:00 p.m. Eastern time Tuesday, 2 August 1994. The brochures have been distributed nationwide, so check university-sponsored programs offices. Alternatively, the text may be downloaded from the Federal Information Exchange at 1-800-783-3349 via computer with modem. FEDIX is also accessible via Internet (Telnet, FTP, or Gopher to "fedix.fic.com", or WWW URL http://web.fic.com); the help number is 301-975-0103. As a last option, send a self-addressed label to Office of Naval Research, Code 353 (Attn: MURI '94), 800 North Quincy Street, Arlington, VA 22217-5660. Expect mailings to take about two weeks. (0151)

**45CONS/PKOA, 1201 Minuteman St, Patrick AFB, FL  
32925-3237**

**A - TECHNICAL ENGINEERING SUPPORT SOL F08650-94-R-0011 DUE 080894 POC Larry D. Long, Contract Negotiator, (407) 494-7091 J.M. Hammerling, Contracting Officer, (407) 494-7091.** Sustaining and technical engineering support to the Air Force Technical Application Center (AFTAC) in the performance of their operation and maintenance of the US Atomic Energy Detection System (USAEDS). The effort will include technical support in seismic, hydro-acoustic, space and atmospheric scientific and engineering areas. Contractor support will consist of scientific and engineering areas to include Planning and Evaluation, Sustaining Engineering, Specialty Engineering Test and Evaluation, Sustaining Logistics Support, Configuration and Data Management, Integration and Installation and technical analysis. Required support will also include the preparation of technical inputs for systems in operation and planned follow-on, redesign or upgraded systems. Primary deliverables consist of test support analyses technical reports and data deliverables. Period of performance is 5 years (basic 12-month and four 1-year options). This effort is a full and open competition. The applicable SIC code for this acquisition is 8711 and the Small Business size standard is \$2.5M. Requests for solicitations must be in writing and may be faxed to (407) 494-5560. NOTE: CONTRACTUAL EFFORT WILL REQUIRE PROCESSING OF CLASSIFIED MATERIAL. AS A RESULT, SOLICITATIONS WILL ONLY BE PROVIDED TO THOSE COMPANIES POSSESSING A FACILITY CLEARANCE AND SAFEGUARDING CAPABILITY AT THE SECRET LEVEL AT THE TIME OF SOLICITATION RELEASE. CLEARANCE VERIFICATION WILL BE REQUESTED FROM THE DEFENSE INVESTIGATIVE SERVICE FOR EACH COMPANY REQUESTING A COPY OF THE SOLICITATION. All solicitation requests must include telephone number, zip code and information as to whether your firm is a large business, small business or small disadvantaged business. No telephone calls, please. All responsible sources may submit a proposal which will be considered by the 45th Space Wing. (0151)

**Contracting Officer, Naval Research Laboratory 4555 Overlook  
Avenue, SW Washington, DC 20375-5326**

**A - ENGINEERING AND TECHNICAL SUPPORT SERVICES SOL N00014-94-R-DA09 POC David Macaluso, Contract Specialist, Code 3240.** Contracting Officer, Mary Ann Carpenter (202) 767-0394. The Naval Research Laboratory has a requirement for engineering support services. The requirement involves technical support in the following areas: (1) Development of Shipboard Periscopic Recognition capabilities, (2) Development of Enhancements to the APS-137 Radar Automatic Detection, Discrimination, Positive Identification of sea/air/land targets, (3) Development of Advanced Processors and Antennas for Next Generation AEW/Ea Warning (AEW) Radar Systems, (4) Planning and demonstration of the Airborne Shipboard Sea Air Land Targeting Surveillance program and updated AEW radar in cooperative engagement environment, (5) Acquire and deliver radar 1 & Q data sea/air/land targets as directed to support all tasks. Many of the tasks must be performed on-site at the Naval Research Laboratory. The contractor shall provide, on level-of-effort basis, approximately thirteen thousand and five hundred (13,500) scientific, technical, engineering, and support hours per year for a three year period including two option years. Telephone requests for this solicitation will not be honored. If nonavailability notice is desired, furnish self-addressed stamped envelope. See request for solicitation N00014-94-R-DA09 to Contracting Officer, Attn: Code 3240.DA, Naval Research Laboratory, 4555 Overlook Ave., SW Washington, DC 20375-5000. RFP closing date is 30 days after issuance. Synopsis DA09. (0151)

**Aviation Applied Technology Directorate, U.S. Army Aviation and  
Troop Command, ATTN: AMSAT-R-TC, Fort Eustis, VA  
23604-5577**

**A - DEVELOPMENT, DESIGN, FABRICATION AND TESTING OF HELICOPTER WEAPONS SIGNATURE SUPPRESSION HARDWARE SOL DAAJ02-94-R-0009 DUE 080594 POC Contract Specialist, Samuel R. Thompson, 804/878-2900/Contracting Officer, John H. Barble, 804/878-2900. CORRECTION** This action was originally published in the CBD dated 05/25/94. Paragraph 17 restated as follows: The objective of this proposed contract is to develop and evaluate concept designs to suppress infrared (IR) signature increase caused by weapon discharge on the AH-64A helicopter. Based on the result of the weapon systems signature characterization and analysis, optimum signature suppression concept design will be developed, fabricated, and ground/flight tested to demonstrate their functionality and effectiveness in IR signature suppression. AATD proposes to conduct negotiation with McDonnell Douglas Helicopter Systems (MDHS), Mesa, AZ on a noncompetitive basis. Technical data, which is proprietary to MDHS, is necessary for performance of this effort. This solicitation contains technical data the export of which is restricted by the Arms Export Control Act (Title 22, U.S.C., Sec 2751 et seq) or Executive Order 12470. Performance under the resulting contract will require access to and/or general classified information. The successful offeror must hold a Secret facility security clearance to be eligible for award. Anticipated solicitation issue date is 16 June 1994. See Numbered Note(s): 8, 22. (0151)

**Office of Naval Research, Ballston Tower One, 800 N. Quincy  
Street, Arlington, VA 22217-5660**

**A - PROPOSED CBD ANNOUNCEMENT FOR FY 1995 YOUNG INVESTIGATOR PROGRAM POC Point of Contact: Don Polk, ONR 333, (703) 696-4111.** The Office of Naval Research announces the FY 1995 Young Investigator Program in which U.S. academic researchers who received Ph.D. (or equivalent degrees on or after 1 December 1989, who are U.S. citizens or permanent residents and who hold tenure-track positions are invited to submit research proposals which address naval research interests. At least 16 awards of \$75,000 per year for three years (with the possibility of greater support for equipment and through matching funds) are anticipated. This notice constitutes a Broad Agency Announcement as contemplated in FAR 6.102(D)(2). Applications must include a research proposal and a letter of commitment from an institution official. Details regarding priority research areas of interest, and proposal preparation and evaluation, can be obtained by accessing FEDIX a no-cost on-line information service, via the Internet (telnet address is "fedix.fic.com" or "192.111.228.33") or telephone modem (1-800-783-3349; modem setup - databits, no parity, 1 stopbit). Alternatively, inquirers may send a self-addressed mailin label to the Office of Naval Research, ONR 353/YIP 94/Room 804, 800 North Quincy Street, Arlington, VA 22217-5660. Applications for FY 1995 consideration must be received by the representatives listed in the brochure by 30 September 1994. (0151)

**EG&G Idaho, Inc., P.O. Box 1625, Idaho Falls, ID 83415-3810**

**A - TENSION BOREHOLE PERMEAMETER** Contact Mr. Steven Borro Potential Licensing Opportunity with EG&G Idaho, Inc., a management and operating contractor for the Department of Energy at the Idaho National Engineering Laboratory (INEL). EG&G Idaho is developing and patenting Tension Borehole Permeameter technologies capable of estimating hydraulic conductivity as a function of soil water tension. The permeameter generates a wide range of soil water fluxes while monitoring tension response. This allows determining hydraulic conductivities with unparalleled precision. The instrumentation is capable of operating in boreholes up to 300 meter deep and once installed can operate unattended for long periods of time. These instruments provide for accurate, cost effective, in situ estimation of hydraulic properties required in vadose zone characterization and monitoring programs. The INEL is soliciting a written indication of interest from industry parties who would consider licensing the above technologies with the intent of commercializing. Interested industry parties should send a description of their company, their research and development capability, their manufacturing and marketing services, and the potential application of the subject technology area to the address below. Steven W. Borro, Office of Research and Technology Applications, EG&G Idaho, Inc., P.O. Box 1625, Idaho Falls, ID 83415-3810. This solicitation closes 20 days after publication. (147)

The Commerce Business Daily (USPS 966-350) is published daily, except Saturdays, Sundays and holidays, for \$324.00 a year (1st Class mailing) or \$275.00 a year (2nd Class mailing) by the U.S. Government Printing Office, Washington, DC 20402. Second Class postage paid at Washington, DC and additional mailing offices. POSTMASTER: Send address changes to Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9373, with entire mailing label from last issue received.



## UNIVERSITY OF MARYLAND AT COLLEGE PARK

CENTER FOR AUTOMATION RESEARCH

Appearance-Based Vision for Complex Environments: Proposal SAI # MD 940728-8040-360201, submitted under the May 1994 program announcement of the FY94 DoD Multidisciplinary Research Program of the University Research Initiative.

December 15, 1994

Attached is a revised budget for a five-year period starting March 1, 1995. The fourth and fifth years can be regarded as options. Detailed budgets for the sub-contracts are also attached.

The principal changes to the budget are as follows:

- 1) Two summer months of co-principal investigator Larry S. Davis during the first year, and one summer month of co-principal investigator Rama Chellappa during the first and second years, will be contributed as cost share.
- 2) The number of Assistant Research Scientists will be 3 during the first two years, 2.8 during the third year, 2.55 during the fourth year, and 2.3 during the fifth year.
- 3) The Word Processor Scientific is reduced to 25%.
- 4) Annual salary increases are estimated at 4% (reduced from 5%).
- 5) Fringe benefits (excluding tuition) are estimated at 25% of salaries (a slight reduction from the detailed estimate in the original proposal).
- 6) The equipment purchase of an SGI Onyx Extreme is eliminated.
- 7) Very small increases are projected for travel and other direct costs.

- 8) Subsistence (for long-term visits by Assistant Research Scientists to the sub-contractors) is reduced from \$24,000 to \$10,000.
- 9) The subcontracts are reduced to \$300,000/yr. (MIT) and \$200,000/yr. (U. of Wash.)

Endorsements:

(b) (6)

Azriel Rosenfeld, Director  
Center for Automation Research

(b) (6)

Erica M. Magrum, Acting Director  
Office of Research Administration  
and Advancement

## REVISED COST PROPOSAL

	Requested First Yr. Funding	Requested Second Yr. Funding	Requested Third Yr. Funding	Total Three Year Funding
<b>Personnel</b>				
Azriel Rosenfeld (P.I.) (1 mo./yr., cost share)	—	—	—	—
Larry Davis (Co-P.I.) (2 mo./yr; cost share in first year)	\$ —	\$ 21,129	\$ 21,974	\$ 43,103
Rama Chellappa (Co-P.I.) (2 mo./yr; 1 mo. cost share in first two years)	9,918	10,315	21,455	41,688
Asst. Research Scientists (3, years 1 & 2; 2.8, year 3)	136,645	142,111	137,942	416,698
David Harwood (Faculty Research Asst., 50%)	23,731	24,680	25,667	74,078
Graduate Research Asst. III (2) (6 mos./yr. each)	27,490	28,590	29,734	85,814
Graduate Research Asst. II (2) (6 mos./yr. each)	26,462	27,520	28,621	82,603
Automation Specialist, 100%	31,075	32,318	33,611	97,004
Word Processor Scientific, 25%	5,912	6,148	6,394	18,454
<b>Total Salaries</b>	<b>261,233</b>	<b>292,811</b>	<b>305,398</b>	<b>859,442</b>
<b>Benefits</b>				
Tuition—60 hours (@ \$210/hr., first year)	12,600	13,104	13,628	39,332
Fringe benefits @ 25% of salaries	65,308	73,203	76,350	214,861
<b>Total Benefits</b>	<b>77,908</b>	<b>86,307</b>	<b>89,978</b>	<b>254,193</b>
<b>Equipment</b>				
Sun SparcStations @ \$15,140 each 4 in year 1, 2 in year 2	60,560	30,280	—	90,840
<b>Maintenance</b> (10% of equipment cost)	—	6,056	9,084	15,140
<b>Travel</b>	30,000	30,500	31,500	92,000
<b>Subsistence</b>	10,000	—	—	10,000
<b>Materials/Supplies</b>	2,000	2,100	2,200	6,300
<b>Publications/Printing</b>	3,000	3,105	3,250	9,355
<b>Telephone/Postage</b>	2,000	2,100	2,200	6,300
<b>Subcontracts</b>				
a) MIT	300,000	300,000	300,000	900,000
b) University of Washington	200,000	200,000	200,000	600,000
<b>Total Direct Costs</b>	<b>\$ 946,701</b>	<b>\$ 953,259</b>	<b>\$ 943,610</b>	<b>\$2,843,570</b>
<b>Indirect Costs @ 48% MTDC</b> [excludes tuition, equipment, and each subcontract after first \$25K]	<b>203,299</b>	<b>196,741</b>	<b>206,390</b>	<b>606,430</b>
<b>Total Costs</b>	<b>\$1,150,000</b>	<b>\$1,150,000</b>	<b>\$1,150,000</b>	<b>\$3,450,000</b>

	(Option) Fourth Yr. Funding	(Option) Fifth Yr. Funding	Total Optional Funding	Total Five Yr. Funding
<b>Personnel</b>				
Azriel Rosenfeld (P.I.) (1 mo./yr., cost share)				
Larry Davis (Co-P.I.) (2 mo./yr.; cost share in first year)	\$ 22,853	\$ 23,767	\$ 46,620	\$ 89,723
Rama Chellappa (Co-P.I.) (2 mo./yr; 1 mo. cost share in first two years)	22,313	23,206	45,519	87,207
Asst. Research Scientists (2.5, fourth year; 2.3, fifth year)	130,652	122,556	253,208	669,906
David Harwood (Faculty Research Asst., 50%)	26,694	27,762	54,456	128,534
Graduate Research Asst. III (2) (6 mos./yr. each)	30,923	32,160	63,083	148,897
Graduate Research Asst. II (2) (6 mos./yr. each)	29,766	30,957	60,723	143,326
Automation Specialist, 100%	34,955	36,353	71,308	168,312
Word Processor Scientific, 25%	6,650	6,916	13,566	32,020
<b>Total Salaries</b>	304,806	303,677	608,483	1,467,925
<b>Benefits</b>				
Tuition—60 hours (@ \$210/hr., first year)	14,173	14,740	28,913	68,245
Fringe benefits @ 25% of salaries	76,202	75,919	152,121	366,982
<b>Total Benefits</b>	90,375	90,659	181,034	435,227
<b>Equipment</b>				
Sun SparcStations @ \$15,140 each 4 in year 1, 2 in year 2	—	—	—	90,840
<b>Maintenance</b> (10% of equipment cost)	9,084	9,084	18,168	33,308
<b>Travel</b>	31,750	32,500	64,250	156,250
<b>Subsistence</b>	—	—	—	10,000
<b>Materials/Supplies</b>	2,235	2,275	4,510	10,810
<b>Publications/Printing</b>	3,300	3,500	6,800	16,155
<b>Telephone/Postage</b>	2,235	2,275	4,510	10,810
<b>Subcontracts</b>				
a) MIT	300,000	300,000	600,000	1,500,000
b) University of Washington	200,000	200,000	400,000	1,000,000
<b>Total Direct Costs</b>	\$ 943,785	\$ 943,970	\$1,887,755	\$4,731,325
<b>Indirect Costs @ 48% MTDC</b> [excludes tuition, equipment, and each subcontract after first \$25K]	206,215	206,030	412,245	1,018,675
<b>Total Costs</b>	\$1,150,000	\$1,150,000	\$2,300,000	\$5,750,000

ONR

Looking at People: Detection, tracking, and interpretation of people and their actions in complex scenes.  
March 1, 1995 - February 28, 2000  
Principal Investigator - Alex P. Pentland

Revised Budget 12/14/94

Salaries	Base	%	Amount Year One	Amount Year Two	Amount Year Three	Amount Year Four	Amount Year Five	GRAND TOTAL
Alex Pentland (AY)	\$74,450	15%	\$0	\$0	\$0	\$0	\$0	\$0
Alex Pentland (Sum)	\$8,272	1 mo.	\$8,272	\$8,686	\$9,120	\$9,576	\$10,055	\$45,709
Rosalind Picard(AY)	\$56,350	15%	\$0	\$0	\$0	\$0	\$0	\$0
Post-Doc/Res. Sci.(TBN)	\$46,000	45%	\$20,700	\$16,905	\$12,075	\$22,822	\$23,963	\$96,465
Word Processor	\$25,000	60%	\$15,000	\$15,750	\$16,538	\$17,364	\$18,233	\$82,884
Administrative Assist.	\$30,150	25%	\$7,538	\$7,914	\$8,310	\$8,726	\$9,162	\$41,649
2 Research Assistants	\$17,820	100%	\$35,640	\$37,422	\$39,293	\$41,258	\$43,321	\$196,933
Total Salaries			\$87,150	\$86,677	\$85,336	\$99,746	\$104,733	\$463,641
Employee Benefits (43.1 %)			\$37,562	\$37,358	\$36,780	\$42,990	\$45,140	\$199,829
Total Salaries + E.B.			\$124,711	\$124,035	\$122,116	\$142,736	\$149,873	\$663,471
Operating Costs								
Materials and Services			\$8,415	\$9,091	\$8,690	\$11,039	\$13,277	\$50,512
Telephones			\$400	\$400	\$400	\$600	\$601	\$2,401
Xeroxing & Printing			\$4,500	\$4,500	\$4,500	\$5,000	\$5,000	\$23,500
Consultant (Stan Sclaroff)			\$10,000	\$10,000	\$5,000	\$0	\$0	\$25,000
Service Contracts			\$5,500	\$5,500	\$5,500	\$5,500	\$5,500	\$27,500
Postage			\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000
Travel			\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
Total Operating Costs			\$35,815	\$36,491	\$31,090	\$29,139	\$31,378	\$163,912
Modified Total Direct Cost			\$160,526	\$160,526	\$153,205	\$171,875	\$181,250	\$827,383
Indirect Cost (52 %)			\$83,474	\$83,474	\$85,795	\$103,125	\$108,750	\$464,617
Capital Equipment			\$56,000	\$56,000	\$56,000	\$15,000	\$0	\$183,000
Consultant (Stan Sclaroff)			\$0	\$0	\$5,000	\$10,000	\$10,000	\$25,000
Total Costs			\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$1,500,000

## **BUDGET JUSTIFICATION**

### **Salaries:**

Dr. Pentland will provide oversight and supervisory functions (15% effort) during the academic year (AY) at no direct cost to the project; funds for his salary will be provided from the Institute's academic account. Dr. Rosalind Picard will also provide 15% effort during the academic year (AY) at no direct cost to the project; funds for her salary will be provided from the Institute's academic account. The budget provides one full month of summer salary in Years One through Five for Dr. Alex Pentland.

Post Doc/Research Scientist level of effort will be 45% in Year One, 35% in Year Two and 25% in Year Three. Their support goes back to 45% for Years Four and Five. In addition, an Administrative Assistant (25% effort) and Word Processor (60% effort) will participate with clerical and administrative duties by supporting Dr. Pentland; their respective equivalent salaries will be supported from this grant. All salaries are inflated at 5% per year in Years Two through Five.

### **Employee Benefits:**

Benefits are calculated at the approved ONR (proposal) rate of 43.1% for all five years of the project.

### **Operating Costs:**

Operating costs represent modest costs for projects of similar scope.

Materials & Services:	For items needed to support Dr. Pentland and his staff while conducting his research on this project; including office supplies, film and developing costs and other materials and services.
Telephones:	For long distance calls in relation to the research being done for this grant.
Xeroxing & Printing:	For papers that are presented at meetings and conferences. Also for submission of research papers to journals for publication.
Consultant	Dr. Stan Sclaroff (Boston University) will be consulting with Dr. Pentland on this research. Dr. Sclaroff is an Assistant Professor of Computer Science in the College of Liberal Arts at BU. Rate is 50 days/year @ \$200/day. Indirect costs will be charged on the first \$25,000. Fees after the \$25,000 will be exempt from indirect costs.
Service Contracts:	For maintenance & software on Sun SPARCstations, DEC stations & Alphas, SGI Indigos and HP workstations.

**Postage:** For all mail associated with the research being done for this grant, i.e. the mailing of papers for submission to journals; correspondence with sponsors, etc.

**Travel:**

In Years One through Five the \$6,000 travel budget will fund a trip to either the ARVO, CVPR or ICCV conference for Dr. Pentland, TBN Post Doctoral/Research Scientist and/or the Research Assistant(s).

**Indirect Costs:**

Indirect costs are calculated at the approved ONR (proposal) rate of 52% for Years One and Two. The cost is 56% for Year Three and 60% for Years Four and Five. The Modified Total Direct Cost Base excludes the cost of capital equipment and consultant subcontractors after the first \$25,000.

**Capital Equipment:**

Year One - \$56,000. Onyx Extreme Deskside, 2x150 MHz R4400, 64 MB memory, 1 MB, 2GB system disk, 19" Monitor, DC-ROM Media.

Year Two - \$56,000. Onyx Extreme Deskside, 2x150 MHz R4400, 64 MB memory, 1 MB, 2GB system disk, 19" Monitor, DC-ROM Media.

Year Three - \$56,000. Onyx Extreme Deskside, 2x150 MHz R4400, 64 MB memory, 1 MB, 2GB system disk, 19" Monitor, DC-ROM Media.

Year Four - \$15,000. Hardware upgrades on above.

Year Five - No funds requested.

**University of Maryland**  
**Three Year Basic Cost Estimate**  
**March 1, 1995 - February 28, 1998**

	Academic Months	Summer Months	Effort	Year 1 1995-96	Year 2 1996-97	Year 3 1997-98	3 Years 1995-98
<b>SALARIES AND WAGES</b>							
Robert Haralick, Professor		1	100%	13,038	13,560	14,102	40,701
Robert Haralick, Professor (Nine months academic base salary @ \$112,038)	9		5%	5,887	6,102	6,346	18,315
(3) Pre-Doctoral Res. Asst. II (Yearly base salary @ \$30,696)	9	3	50%	47,886	49,801	51,793	149,480
Research Program Coordinator (Yearly base salary @ \$30,696)	9	3	25%	7,981	8,300	8,632	24,913
Hourly Personnel (\$10/hr @ 500 hrs/yr; estimated 40-45 hrly person hrs/month)				5,000	5,000	0	10,000
<b>TOTAL SALARIES, WAGES</b>				<b>79,773</b>	<b>82,762</b>	<b>80,873</b>	<b>243,408</b>
<b>FRINGE BENEFITS</b>							
Faculty @ 22%				4,159	4,326	4,499	12,984
Graduate Students @ 8%				3,831	3,984	4,143	11,958
Professional Staff @ 26%				2,075	2,158	2,244	6,477
Hourly @ 10%				500	500	0	1,000
<b>TOTAL BENEFITS</b>				<b>10,565</b>	<b>10,968</b>	<b>10,886</b>	<b>32,419</b>
<b>TOTAL SALARIES &amp; BENEFITS</b>				<b>90,338</b>	<b>93,730</b>	<b>91,759</b>	<b>275,828</b>
<b>EQUIPMENT (Computer Upgrade &amp; Equipment)</b>							
				16,000	10,000	8,500	34,500
<b>EXPENDABLE SUPPLIES</b>							
Computer Software				4,000	4,000	7,000	15,000
Computer Equipment Supplies				2,000	2,000	2,000	6,000
Miscellaneous Supplies				2,400	1,875	1,600	5,875
<b>TOTAL SUPPLIES</b>				<b>8,400</b>	<b>7,875</b>	<b>10,600</b>	<b>26,875</b>
<b>SERVICES</b>							
Computer Laboratory Fees				7,000	7,000	7,000	21,000
Publications				2,000	2,000	2,000	6,000
Postage, Telephone, Facsimile, Copy, etc.				1,500	1,500	1,475	4,475
<b>TOTAL SERVICES</b>				<b>10,500</b>	<b>10,500</b>	<b>10,475</b>	<b>31,475</b>
<b>TRAVEL</b>							
				3,000	3,000	2,000	8,000
<b>GRADUATE OPERATING FEES</b>				<b>17,325</b>	<b>19,067</b>	<b>20,970</b>	<b>57,362</b>
<b>TOTAL DIRECT COSTS:</b>				<b>145,563</b>	<b>144,173</b>	<b>144,305</b>	<b>434,041</b>
<b>INDIRECT COSTS @ 48.5%</b>				<b>64,437</b>	<b>65,827</b>	<b>65,695</b>	<b>195,959</b>
<b>TOTAL DIRECT AND INDIRECT COSTS:</b>				<b>200,000</b>	<b>200,000</b>	<b>200,000</b>	<b>600,000</b>

Note: 4% increase/year projected for salaries starting the second year.

10% increase/year projected for tuition starting the second year.

Graduate Operating Fees and Equipment are exempt from indirect costs.

**University of Maryland**  
**Two Year Option Cost Estimate**  
**March 1, 1998 - February 28, 2000**

	Academic Months	Summer Months	Effort	Year 4 1998-99	Year 5 99-2000	2 Yr Option 1998-2000
<b>SALARIES AND WAGES</b>						
Robert Haralick, Professor		1	100%	14,657	15,253	29,920
Robert Haralick, Professor (Nine months academic base salary @ \$112,833)	9		5%	5,600	5,864	13,464
(3) Pre-Doctoral Res. Asst. II (Yearly base salary @ \$30,696)	9	3	50%	53,865	56,020	109,885
Research Program Coordinator (Yearly base salary @ \$30,696)	9	3	25%	8,977	9,337	18,314
Hourly Personnel (\$10/hr @ 500 hrs/yr; estimated 40-45 hrly person hrs/month)				0	0	0
<b>TOTAL SALARIES, WAGES</b>				<b>84,109</b>	<b>87,472</b>	<b>171,581</b>
<b>FRINGE BENEFITS</b>						
Faculty @ 22%				4,679	4,866	9,544
Graduate Students @ 8%				4,309	4,482	8,791
Professional Staff @ 25%				2,334	2,428	4,762
Hourly @ 10%				0	0	0
<b>TOTAL BENEFITS</b>				<b>11,323</b>	<b>11,774</b>	<b>23,097</b>
<b>TOTAL SALARIES &amp; BENEFITS</b>				<b>95,432</b>	<b>99,246</b>	<b>194,678</b>
<b>EQUIPMENT</b> (Computer Upgrade & Equipment)				<b>6,000</b>	<b>4,000</b>	<b>10,000</b>
<b>EXPENDABLE SUPPLIES</b>						
Computer Software				6,500	6,500	13,000
Computer Equipment Supplies				2,000	2,000	4,000
Miscellaneous Supplies				2,000	0	2,000
<b>TOTAL SUPPLIES</b>				<b>10,500</b>	<b>8,500</b>	<b>19,000</b>
<b>SERVICES</b>						
Computer Laboratory Fees				7,000	5,000	12,000
Publications				0	0	0
Postage, Telephone, Facsimile, Copy, etc.				1,200	1,200	2,400
<b>TOTAL SERVICES</b>				<b>8,200</b>	<b>6,200</b>	<b>14,400</b>
<b>TRAVEL</b>				<b>1,000</b>	<b>1,000</b>	<b>2,000</b>
<b>GRADUATE OPERATING FEES</b>				<b>23,031</b>	<b>25,307</b>	<b>48,338</b>
<b>TOTAL DIRECT COSTS:</b>				<b>144,163</b>	<b>144,253</b>	<b>288,415</b>
<b>INDIRECT COSTS @ 48.5%</b>				<b>55,837</b>	<b>55,747</b>	<b>111,584</b>
<b>TOTAL DIRECT AND INDIRECT COSTS:</b>				<b>200,000</b>	<b>200,000</b>	<b>400,000</b>

Note: 4% increase/year projected for salaries starting the second year.

10% increase/year projected for tuition starting the second year.

Graduate Operating Fees and Equipment are exempt from indirect costs.